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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/765,712	YOUNG, RANDY K.	
	Examiner	Art Unit	
	Freshteh N. Aghdam	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21,56-60 and 65-98* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21,56-60 and 65-98* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 3/15/2007 have been fully considered but they are not persuasive.

Applicant's Argument(s): Regarding independent claims, page 22, the applicant argues that the claimed invention is not taught or suggested by Tsuijimoto "Contrary to the Office's assertions, means 303 in FIG. 3(a) in Tsujimoto does not disclose or suggest modulator/demodulator system comprising a transmission system, which applies one of a plurality of time scales (Fig. 3a, means 303). The Office's attention is respectfully directed to FIG. 3(a) and also to col. 4, lines 15 -21 in Tsujimoto which states, "the pair of outputs of modulators 102... are supplied to a pair of spread spectrum signal generators 303 employing mutually different pseudo-noise code sequences for code division multiplexing" (Emphasis added). Accordingly, the means 303 cited by the Office is for code division multiplexing which is not time scaling. Additionally, there is no other teaching or suggestion of any time scaling in Tsujimoto. Further, as set forth in greater detail in the accompanying declaration of Randy Young, time-scaling can not be realized with the spread spectrum signal generators disclosed in Tsujimoto. Like Tsujimoto, Proctor, Schilling, Tsui, and Applicant's disclosure on page 1, lines 8-13, cited by the Office, also do not disclose or suggest time scaling as claimed."

Examiner's Response: In response to the argument set forth above, examiner respectfully disagrees with the applicant because for rejecting the claimed

limitation, the examiner made the broadest reasonable interpretation as to what constitutes time scaling. One of ordinary skill in the art would recognize that when a signal is subjected to spreading the bandwidth of the signal is expanded (e.g. time duration is compressed); therefore, the cited portion of Tsujimoto meets the claimed limitation.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 5-6, 8, 12, 15-16, 18, 68-70, 72-73, 77, 79-80, 92, 95 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsujimoto (US 5,859,870).

As to claims 1,12, 69, 92, Tsujimoto discloses a modulator/demodulator system comprising a transmission system, which applies one of a plurality of time scales (Fig. 3a, means 303) and one of a plurality of time delays (Fig. 3a, means 101) to one of a pair of substantially matched base signals (Fig. 3a, Data Symbol Sequence an), combines the time scaled and time delayed base signal with the other one of the pair of base signals to form a doublet (Fig. 3a, means 104), and transmits the doublet signal (Fig. 3a, means 305-306); and a receiving system which receives the doublet and extracts information from the doublet based on the one of the plurality of time scales

and the one of the plurality of time delays which were applied (Fig. 3b, means 110 and 312).

As to claims 2, 70, Tsujimoto discloses generating a pair of substantially matched base signals (Fig. 3a); an encoding system, which modulates the one of the plurality of time scales and the one of the plurality of time delays onto the one of the pair of substantially matched base signals (Fig. 3a, means 101 and 303); a combiner which combines the time scaled and the time delayed base signal with the other one of the pair of base signals to form the doublet (Fig. 3a, means 104); and a transmitter which transmits the doublet (Fig. 3a, means 305-306).

As to claims 5, 72, Tsujimoto discloses that the at least one of the pair of substantially matched base signals contains the information and the receiving system extracts the information from the at least one of the pair of substantially matched base signals in the doublet (Fig. 3a and 3b).

As to claims 6, 16, 73, 80, 95, Tsujimoto discloses that the combiner is an adder or a subtractor (Fig. 3a, means 104).

As to claims 8 and 18, Tsujimoto discloses that the information comprises a message embedded by the transmission system (Fig. 3a).

As to claim 15, 79, Tsujimoto discloses embedding information in one of the pair of substantially matched base signals in the doublet (Fig. 3a).

As to claim 68, Tsujimoto discloses a receiving method comprising receiving a doublet comprising a combined pair of substantially matched base signals; and extracting information from one of the pair of substantially matched base signals in the

doublet based on one of a plurality of time scales which was applied to the doublet (Fig. 3a-3b and 6a-6b).

As to claim 77, Tsujimoto discloses a method for communicating comprising applying one of a plurality of time delays to one of a pair of substantially matched base signals to embed communication information; combining the time scaled and time delayed base signals with the other one of the pair of base signals to form a doublet (Fig. 3a and 6a); transmitting the doublet into the environment; receiving the doublet; and extracting the communication information from the doublet based on the one of the plurality of time scales and on the one of the plurality of time delays which were applied (112 and 619).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 10, 14, 20, 57-59, 62, 66, 71, 75, 78, 82, 97 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsujimoto.

As to claims 3,14, 71, 78, Tsujimoto discloses combining a plurality of time scaled and time delayed substantially matched base signals with the other one of the base signals to obtain the composite signal to be transmitted to the receiving system, wherein the plurality of time scales and time delays are different (Fig. 6a and 6b).

Tsujimoto is not explicit about the transmission system has a plurality of doublets with an independent one of a plurality of the time scales and independent one of the plurality of time delays applied to each of the doublets, the transmission system combines all of the doublets to form and transmit a composite signal. However, one of ordinary skill in art would recognize that generating a plurality of doublets with an independent one of a plurality of the time scales and independent one of the plurality of time delays applied to each of the doublets, the transmission system combines all of the doublets to form the composite signal in terms of functionality is the same as combining the plurality of time scaled and time delayed substantially matched base signals with the other one of the base signals to obtain the composite signal to be transmitted to the receiving system, wherein the plurality of time scales and time delays are different as it is demonstrated in figure 6a. Therefore, it would have been obvious to one of ordinary skill in the art to obtain the same composite signal utilizing Tsujimoto's teaching in order to reduce the number of combiners in the device.

As to claims 57-58, Tsujimoto discloses a receiver which receives a doublet (Fig. 3b and 6b, means 307 and 609); a processing system which extracts the information from the doublet based on one of a plurality of time scales which was applied to the doublet prior to transmission (Fig. 3b and 6b, means 309, 109, 312, 112, 611, 612, 617, and 619); the receiving system further comprises a device that time scales a received doublet signal by the time scale that was applied by the transmission system to form a time scaled version of the received signal prior to transmission (i.e. despreading the received signal; Fig. 3b; Col. 4, Lines 28-37). Tsujimoto is not explicit about the receiver

receives a plurality of the doublets in a composite signal and the processing system extracts the information from the composite signal based on the one of the plurality of time scales which was applied to each of the doublets. However, one of ordinary skill in the art would recognize that generating a plurality of doublets with a plurality of the time scales and time delays applied to each of the doublets, the transmission system combines all of the doublets to form the composite signal to be received by the receiving system, in terms of functionality, is the same as combining the plurality of time scaled and time delayed substantially matched base signals with the other one of the base signals to obtain the composite signal to be transmitted to the receiving system, wherein the plurality of time scales and time delays are different as it is demonstrated in figure 6a-6b and the receiving system extracts the information from the composite signal based on the one of the plurality of time scales and time delays which was applied to each of the signals. Therefore, it would have been obvious to one of ordinary skill in the art to obtain the same composite signal utilizing Tsujimoto's teaching in order to reduce the number of combiners in the device (i.e. reducing the complexity of the device).

As to claim 62, One of ordinary skill in the art would recognize that generating a plurality of doublets with a plurality of the time scales and time delays applied to each of the doublets, the transmission system combines all of the doublets to form the composite signal to be received by the receiving system, in terms of functionality, is the same as combining the plurality of time scaled and time delayed substantially matched base signals with the other one of the base signals to obtain the composite signal to be

transmitted to the receiving system, wherein the plurality of time scales and time delays are different as it is shown in figure (Tsujimoto; Fig. 6a-6b) and the receiving system extracts the information from the composite signal based on the one of the plurality of time scales and time delays which was applied to each of the signals. Therefore, it would have been obvious to one of ordinary skill in the art to obtain the same composite signal utilizing Tsujimoto's teaching in order to reduce the number of combiners in the device (i.e. reducing the complexity of the device).

As to claims 10, 20, 75, 82, 97, Tsujimoto discloses a time scaling means which applies at least one of the plurality of time scales to each of the received segments to form a time scaled received signal (Fig. 6b, means 611-612); a time delaying means which applies at least one of the plurality of time delays to the received signal (Fig. 6b, means 613-615); a multiplier which multiplies each of the time scaled signal with the time delayed signal to form a multiplied signal (Fig. 3b and 6b, means 617); an integrator which integrates the multiplied signals across time to form detection signals (Fig. 3b and 6b); and a processing system which compares the detection signals at different ones of the plurality of time scales and different ones of the plurality of time delays over time to determine the applied one of the plurality of time scales and time delays to extract the information from the detection signal (Fig. 6b, means 612, 617, and 619). Tsujimoto is not explicit about forming received segments from the received composite signal (i.e. segmenting the received composite signal into blocks). However, one of ordinary skill in the art would recognize that a received signal includes different blocks and/ or symbols such as preamble and/ or mid-amble, data or payload, signaling

information, and so on for improving information transmission in communication systems. Therefore, it would have been obvious to one of ordinary skill in the art to transmit and receive a signal that comprises different blocks and/ or symbols for the reason stated above.

As to claim 59, Tsujimoto discloses a receiver which receives a doublet (i.e. through antenna(s); Fig. 3b and 6b); a processing system which extracts the information from the doublet based on one of a plurality of time scales which was applied top the doublet prior to transmission (Fig. 3b and 6b, means Fig. 3b and 6b, means 309, 109, 312, 112, 611, 612, 617, and 619); wherein the receiver further comprises a time scaling means which applies at least one of the plurality of time scales to each of the received segments to form a time scaled received signal (Fig. 6b, means 611-612); a time delaying means which applies at least one of the plurality of time delays to the received signal (Fig. 6b, means 613-615); a multiplier which multiplies each of the time scaled signal with the time delayed signal to form a multiplied signal (Fig. 3b and 6b, means 617); an integrator which integrates the multiplied signals across time to form detection signals (Fig. 3b and 6b); and a processing system which compares the detection signals at different ones of the plurality of time scales and different ones of the plurality of time delays over time to determine the applied one of the plurality of time scales and time delays to extract the information from the detection signal (Fig. 6b, means 612, 617, and 619). Tsujimoto is not explicit about forming received segments from the received composite signal (i.e. segmenting the received composite signal into blocks). However, one of ordinary skill in the art would recognize that a received signal

includes different blocks and/ or symbols such as preamble and/ or mid-amble, data or payload, signaling information, and so on for improving information transmission in communication systems. Therefore, it would have been obvious to one of ordinary skill in the art to transmit and receive a signal that comprises different blocks and/ or symbols for the reason stated above.

As to claim 66, Tsujimoto discloses a receiver which receives a doublet (i.e. through antenna(s); Fig. 3b and 6b); a processing system which extracts the information from the doublet based on one of a plurality of time scales which was applied top the doublet prior to transmission (Fig. 3b and 6b, means Fig. 3b and 6b, means 309, 109, 312, 112, 611, 612, 617, and 619); wherein the receiver further comprises a time scaling means which applies at least one of the plurality of time scales to each of the received segments to form a time scaled received signal (Fig. 6b, means 611-612); a time delaying means which applies at least one of the plurality of time delays to the received signal (Fig. 6b, means 613-615); a multiplier which multiplies each of the time scaled signal with the time delayed signal to form a multiplied signal (Fig. 3b and 6b, means 617); an integrator which integrates the multiplied signals across time to form detection signals (Fig. 3b and 6b); and processing the detection signals at different ones of the plurality of time scales and different ones of the plurality of time delays over time to determine the applied one of the plurality of time scales and time delays to extract the information from the detection signal (Fig. 6b, means 612, 617, and 619). Tsujimoto is not explicit about forming received segments from the received composite signal (i.e. segmenting the received composite signal into blocks). However, one of

ordinary skill in the art would recognize that a received signal includes different blocks and/ or symbols such as preamble and/ or mid-amble, data or payload, signaling information, and so on for improving information transmission in communication systems. Therefore, it would have been obvious to one of ordinary skill in the art to transmit and receive a signal that comprises different blocks and/ or symbols for the reason stated above.

Claims 4,13, 93-94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsujimoto, further in view of Proctor, Jr. et al (US 5,687,196) and Schilling (US 2005/0008065).

As to claims 4,13, 93, Tsujimoto discloses that the receiving system further comprises a device that time scales a received signal by the time scale that was applied by the transmission system to form a time scaled version of the received signal (i.e. despreading the received signal; Fig. 3b; Col. 4, Lines 28-37), a correlator that correlates the received signal (Fig. 6b, reception data signal A; Col. 4, Lines 37-60) with the time scaled version of the received signal to form a time delay correlation signal with peaks; a detector that detects the peaks of this time delay offset correlation signal (i.e. impulse response characteristics of transmission paths; Col. 4, Lines 61-67; Col. 5, Lines 1-67); and an estimator (Fig. 3b and 6b, means 112 and 619) that uses the time delay offset locations of the peaks to estimate the transmitted signals. Tsujimoto is not explicit about Tsujimoto is not explicit about estimating the angle of arrival of each of the received signals by utilizing the time delay locations of the peaks; the transmission

system further comprises a pair of synchronized and spatially separated radiating elements, one radiating element radiates one of the substantially matched base signals and the other radiating element radiates the time scaled and time delayed base signal. Proctor discloses estimating the angle of arrival of each of the received signals by utilizing the time delay locations of the peaks (Col. 3, Lines 39-67; Col. 4, Lines 1-5). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Proctor with Tsujimoto in order to estimate the transmitted information in the receiver and enhancing the information transmission by estimating the angle of arrival of each of the received signals.Schilling discloses a communication system, wherein the transmission system further comprises a pair of synchronized and spatially separated radiating elements, one radiating element radiates one of the substantially matched base signals and the other radiating element radiates the time scaled and time delayed base signal (Fig. 4, means TA1 and TA2; Par. 33 and 45). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Schilling with Tsujimoto and Proctor in order to improve signal transmission reliability by utilizing two spatially separated antennas (Par. 2).

As to claim 94, Tsujimoto discloses combining a plurality of time scaled and time delayed substantially matched base signals with the other one of the base signals to obtain the composite signal to be transmitted to the receiving system, wherein the plurality of time scales and time delays are different (Fig. 6a and 6b). Tsujimoto is not explicit about the transmission system has a plurality of doublets with an independent one of a plurality of the time scales and independent one of the plurality of time delays

applied to each of the doublets, the transmission system combines all of the doublets to form and transmit a composite signal. However, one of ordinary skill in art would recognize that generating a plurality of doublets with an independent one of a plurality of the time scales and independent one of the plurality of time delays applied to each of the doublets, the transmission system combines all of the doublets to form the composite signal in terms of functionality is the same as combining the plurality of time scaled and time delayed substantially matched base signals with the other one of the base signals to obtain the composite signal to be transmitted to the receiving system, wherein the plurality of time scales and time delays are different as it is demonstrated in figure 6a. Therefore, it would have been obvious to one of ordinary skill in the art to obtain the same composite signal utilizing Tsujimoto's teaching in order to reduce the number of combiners in the device.

Claims 7, 11, 17, 21, 60, 67, 74, 76, 81, 83, 96, 98 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsujimoto, and further in view of Tsui et al (US 6,385,237).

As to claims 7,11, 17, 21, 74, 76, 81, 83, 96, and 98, Tsujimoto discloses an equalizer to evenly distribute the signal energy across a signal (Fig. 3b and 6b). Tsujimoto is not explicit about a temporal equalizer, which evenly distributes the signal energy across the duration of a signal; and a spectral equalizer that evenly distributes the signal energy across the spectrum of a signal. One of ordinary skill in the art would recognize that the temporal and spectral equalizers are well known in the art and

employed to evenly distribute the signal energy as it is evidenced by Tsui (Col. 9, Lines 12-36; Col. 11, Lines 53-57). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Tsui with Tsujimoto for the reason stated above.

As to claims 60, 67, Tsujimoto discloses a receiver which receives a doublet (i.e. through antenna(s); Fig. 3b and 6b); a processing system which extracts the information from the doublet based on one of a plurality of time scales which was applied to the doublet prior to transmission (Fig. 3b and 6b, means Fig. 3b and 6b, means 309, 109, 312, 112, 611, 612, 617, and 619); wherein the receiver further comprises an equalizer to evenly distributes the signal energy across a signal (Fig. 3b and 6b). Tsujimoto is not explicit about a temporal equalizer, which evenly distributes the signal energy across the duration of a signal; and a spectral equalizer that evenly distributes the signal energy across the spectrum of a signal. One of ordinary skill in the art would recognize that the temporal and spectral equalizers are well known in the art and employed to evenly distribute the signal energy as it is evidenced by Tsui (Col. 9, Lines 12-36; Col. 11, Lines 53-57). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Tsui with Tsujimoto for the reason stated above.

Claims 9, 19, 65, 84-86, 88, 90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsujimoto, and further in view of the instant application's disclosed prior art.

As to claims 9, 19, Tsujimoto teach all the subject matter claimed in claim 1, except for the information comprises imaging data embedded by an environment in which the doublet was transmitted. One of ordinary skill in the art would recognize that the information includes imaging data embedded by the environment onto the modulated transmit signal as it is evidenced by the instant application's disclosed prior art (Pg. 1, Lines 8-13) for the purpose of enhancing information communication between a transmitter and a receiver device. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of the instant application's disclosed prior art with Tsujimoto for the reason stated above.

As to claim 65, Tsujimoto discloses a receiving method comprising receiving a doublet (Fig. 3b and 6b, antenna means); and extracting information from the doublet based on one of a plurality of time scales, which was applied to the doublet (Fig. 3b and 6b, means 309, 109, and 611-612). Tsujimoto is not explicit about the information comprises imaging data embedded by an environment in which the doublet was transmitted. One of ordinary skill in the art would recognize that the information includes imaging data embedded by the environment onto the modulated transmit signal as it is evidenced by the instant application's disclosed prior art (Pg. 1, Lines 8-13) for the purpose of enhancing information communication between a transmitter and a receiver device. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of the instant application's disclosed prior art with Tsujimoto for the reason stated above.

As to claim 84, Tsujimoto discloses a modulator/demodulator system comprising a transmission system, which applies one of a plurality of time scales (Fig. 3a, means 303) and one of a plurality of time delays (Fig. 3a, means 101) to one of a pair of substantially matched base signals (Fig. 3a, Data Symbol Sequence an), combines the time scaled and time delayed base signal with the other one of the pair of base signals to form a doublet (Fig. 3a, means 104), and transmits the doublet signal (Fig. 3a, means 305-306); and a receiving system which receives the doublet and extracts information from the doublet based on the one of the plurality of time scales and the one of the plurality of time delays which were applied (Fig. 3b, means 110 and 312). Tsujimoto is not explicit about the information comprises imaging data embedded by an environment in which the doublet was transmitted. One of ordinary skill in the art would recognize that the information includes imaging data embedded by the environment onto the modulated transmit signal as it is evidenced by the instant application's disclosed prior art (Pg. 1, Lines 8-13) for the purpose of enhancing information communication between a transmitter and a receiver device. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of the instant application's disclosed prior art with Tsujimoto for the reason stated above.

As to claim 85, Tsujimoto discloses generating a pair of substantially matched base signals (Fig. 3a); an encoding system, which modulates the one of the plurality of time scales and the one of the plurality of time delays onto the one of the pair of substantially matched base signals (Fig. 3a, means 101 and 303); a combiner which combines the time scaled and the time delayed base signal with the other one of the

pair of base signals to form the doublet (Fig. 3a, means 104); and a transmitter which transmits the doublet (Fig. 3a, means 305-306).

As to claim 86, Tsujimoto discloses combining a plurality of time scaled and time delayed substantially matched base signals with the other one of the base signals to obtain the composite signal to be transmitted to the receiving system, wherein the plurality of time scales and time delays are different (Fig. 6a and 6b). Tsujimoto is not explicit about the transmission system has a plurality of doublets with an independent one of a plurality of the time scales and independent one of the plurality of time delays applied to each of the doublets, the transmission system combines all of the doublets to form and transmit a composite signal. However, one of ordinary skill in art would recognize that generating a plurality of doublets with an independent one of a plurality of the time scales and independent one of the plurality of time delays applied to each of the doublets, the transmission system combines all of the doublets to form the composite signal in terms of functionality is the same as combining the plurality of time scaled and time delayed substantially matched base signals with the other one of the base signals to obtain the composite signal to be transmitted to the receiving system, wherein the plurality of time scales and time delays are different as it is demonstrated in figure 6a. Therefore, it would have been obvious to one of ordinary skill in the art to obtain the same composite signal utilizing Tsujimoto's teaching in order to reduce the number of combiners in the device.

As to claim 88, Tsujimoto discloses that the combiner is an adder or a subtractor (Fig. 3a, means 104).

As to claim 90, Tsujimoto discloses a time scaling means which applies at least one of the plurality of time scales to each of the received segments to form a time scaled received signal (Fig. 6b, means 611-612); a time delaying means which applies at least one of the plurality of time delays to the received signal (Fig. 6b, means 613-615); a multiplier which multiplies each of the time scaled signal with the time delayed signal to form a multiplied signal (Fig. 3b and 6b, means 617); an integrator which integrates the multiplied signals across time to form detection signals (Fig. 3b and 6b); and a processing system which compares the detection signals at different ones of the plurality of time scales and different ones of the plurality of time delays over time to determine the applied one of the plurality of time scales and time delays to extract the information from the detection signal (Fig. 6b, means 612, 617, and 619). Tsujimoto is not explicit about forming received segments from the received composite signal (i.e. segmenting the received composite signal into blocks). However, one of ordinary skill in the art would recognize that a received signal includes different blocks and/ or symbols such as preamble and/ or mid-amble, data or payload, signaling information, and so on for improving information transmission in communication systems. Therefore, it would have been obvious to one of ordinary skill in the art to transmit and receive a signal that comprises different blocks and/ or symbols for the reason stated above.

Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsujimoto, and further in view of Proctor, Jr. et al (US 5,687,196).

As to claim 56, Tsujimoto discloses a receiver which receives a doublet (Fig. 3b and 6b, means 307 and 609); a processing system which extracts the information from the doublet based on one of a plurality of time scales which was applied to the doublet prior to transmission (Fig. 3b and 6b, means 309, 109, 312, 112, 611, 612, 617, and 619); the receiving system further comprises a device that time scales a received doublet signal by the time scale that was applied by the transmission system to form a time scaled version of the received signal (i.e. despreading the received signal; Fig. 3b; Col. 4, Lines 28-37), a correlator that correlates the received signal (Fig. 6b, reception data signal A; Col. 4, Lines 37-60) with the time scaled version of the received signal to form a time delay correlation signal with peaks; a detector that detects the peaks of this time delay offset correlation signal (i.e. impulse response characteristics of transmission paths; Col. 4, Lines 61-67; Col. 5, Lines 1-67); and an estimator (Fig. 3b and 6b, means 112 and 619) that uses the time delay offset locations of the peaks to the transmitted signals. Tsujimoto is not explicit about estimating the angle of arrival of each of the received signals by utilizing the time delay locations of the peaks. Proctor discloses estimating the angle of arrival of each of the received signals by utilizing the time delay locations of the peaks (Col. 3, Lines 39-67; Col. 4, Lines 1-5). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Proctor with Tsujimoto in order to estimate the transmitted information in the receiver and enhancing the information transmission by estimating the angle of arrival of each of the received signals.

Claim 87 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsujimoto and the instant application's disclosed prior art, further in view of Proctor, Jr. et al (US 5,687,196) and Schilling (US 2005/0008065).

As to claim 87, Tsujimoto discloses that the receiving system further comprises a device that time scales a received signal by the time scale that was applied by the transmission system to form a time scaled version of the received signal (i.e. despreading the received signal; Fig. 3b; Col. 4, Lines 28-37), a correlator that correlates the received signal (Fig. 6b, reception data signal A; Col. 4, Lines 37-60) with the time scaled version of the received signal to form a time delay correlation signal with peaks; a detector that detects the peaks of this time delay offset correlation signal (i.e. impulse response characteristics of transmission paths; Col. 4, Lines 61-67; Col. 5, Lines 1-67); and an estimator (Fig. 3b and 6b, means 112 and 619) that uses the time delay offset locations of the peaks to estimate the transmitted signals. Tsujimoto is not explicit about Tsujimoto is not explicit about estimating the angle of arrival of each of the received signals by utilizing the time delay locations of the peaks; the transmission system further comprises a pair of synchronized and spatially separated radiating elements, one radiating element radiates one of the substantially matched base signals and the other radiating element radiates the time scaled and time delayed base signal. Proctor discloses estimating the angle of arrival of each of the received signals by utilizing the time delay locations of the peaks (Col. 3, Lines 39-67; Col. 4, Lines 1-5). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Proctor with Tsujimoto in order to estimate the transmitted information in the

receiver and enhancing the information transmission by estimating the angle of arrival of each of the received signals.Schilling discloses a communication system, wherein the transmission system further comprises a pair of synchronized and spatially separated radiating elements, one radiating element radiates one of the substantially matched base signals and the other radiating element radiates the time scaled and time delayed base signal (Fig. 4, means TA1 and TA2; Par. 33 and 45). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Schilling with Tsujimoto and Proctor in order to improve signal transmission reliability by utilizing two spatially separated antennas (Par. 2).

Claim 89, 91 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsujimoto, and the instant application's disclosed prior art, further in view of Tsui et al (US 6,385,237).

As to claims 89, 91, Tsujimoto discloses an equalizer to evenly distribute the signal energy across a signal (Fig. 3b and 6b). Tsujimoto is not explicit about a temporal equalizer, which evenly distributes the signal energy across the duration of a signal; and a spectral equalizer that evenly distributes the signal energy across the spectrum of a signal. One of ordinary skill in the art would recognize that the temporal and spectral equalizers are well known in the art and employed to evenly distribute the signal energy as it is evidenced by Tsui (Col. 9, Lines 12-36; Col. 11, Lines 53-57). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Tsui with Tsujimoto for the reason stated above.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gillberg et al (US 6,393,316) see column 11 is directed to discrete wavelet transform that is superposition of the base signal and the time delayed and time scaled versions of the base signal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Freshteh N. Aghdam whose telephone number is 571-272-6037. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Freshteh Aghdam
Examiner
Art Unit 2611

May 17, 2007

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PRIMARY EXAMINER